



**CFA Institute**<sup>®</sup>  
Investment Foundations

**It's Free!**

**Do it!**

## **Module 4: INVESTMENT INSTRUMENTS**

### **Chapter 9: Debt Securities**

Ted Stephenson, CFA, CPA, CMA, CFP, MBA  
Professor, George Brown College  
St. James Campus  
290 Adelaide St. E.,  
Toronto, Ontario, M5T 2T9

[Faculty Bio](#)



Module	Topic	Weight	LOS	Exam Qs	Hours to Study	Module Practice Qs	Chapter Practice Qs
<b>Module 1</b>	<b>Industry overview</b>	5%	7	6	5	28	28
Chapter 1	The Investment Industry: A Top-Down View						
<b>Module 2</b>	<b>Ethics and regulation</b>	10%	14	12	10	91	
Chapter 2	Ethics and Investment Professionalism						49
Chapter 3	Regulation						42
<b>Module 3</b>	<b>Inputs and tools</b>	20%	50	24	20	291	
Chapter 4	Microeconomics						53
Chapter 5	Macroeconomics						57
Chapter 6	Economics of International Trade						47
Chapter 7	Financial Statements						70
Chapter 8	Quantitative Concepts						64
<b>Module 4</b>	<b>Investment instruments</b>	20%	29	24	20	213	
Chapter 9	Debt Securities						69
Chapter 10	Equity Securities						72
Chapter 11	Derivatives						42
Chapter 12	Alternative Investments						30
<b>Module 5</b>	<b>Industry structure</b>	20%	27	24	20	96	
Chapter 13	Structure of the Investment Industry						28
Chapter 14	Investment Vehicles						29
Chapter 15	The Functioning of Financial Markets						39
<b>Module 6</b>	<b>Serving client needs</b>	5%	12	6	5	76	
Chapter 16	Investors and Their Needs						35
Chapter 17	Investment Management						41
<b>Module 7</b>	<b>Industry controls</b>	20%	24	24	20	154	
Chapter 18	Risk Management						51
Chapter 19	Performance Evaluation						53
Chapter 20	Investment Industry Documentation						50
	<b>Total</b>	<b>100%</b>	<b>163</b>	<b>120</b>	<b>100</b>	<b>949</b>	<b>949</b>

## AFTER COMPLETING THIS CHAPTER, YOU SHOULD BE ABLE TO DO THE FOLLOWING:

- a) Identify issuers of debt securities;
- b) Describe features of debt securities;
- c) Describe seniority ranking of debt securities when default occurs;
- d) Describe types of bonds;
- e) Describe bonds with embedded provisions;
- f) Describe securitisation and asset-backed securities;
- g) Define current yield;
- h) Describe the discounted cash flow approach to valuing debt securities;
- i) Describe a bond's yield to maturity;
- j) Explain the relationship between a bond's price and its yield to maturity;
- k) Define yield curve;
- l) Explain risks of investing in debt securities;
- m) Define a credit spread.

# ISSUERS OF DEBT SECURITIES



If people invest in a company and earn interest by buying bonds, ***they are the lenders*** and ***the company is the borrower.***

The borrower (issuer) may be a company or a government, and the investors may be individuals, companies, or governments.

Companies may also raise capital by issuing (selling) equity securities, which is discussed in the Equity Securities chapter.

LOS a: Identify issuers of debt securities.

# FEATURES OF DEBT SECURITIES

**Debt securities represent a contractual obligation of the issuer to the holder of the debt security.**

**A bond is governed by a legal contract between the bond issuer and the bondholders.**

<b>Par Value</b>	<b>Coupon Rate</b>	<b>Maturity Date</b>
Amount paid at maturity	Promised interest rate	Typically 30 years or less
Also called principal or face value	Coupon payments linked to par value	Payments end on the maturity date

LOS b: Describe features of debt securities.

## OTHER FEATURES

**Other features may be included in the bond contract to make it more attractive to bondholders.**

- For instance, to protect bondholders' interests, it is common for the bond contract to contain **covenants**, which are legal agreements that describe actions the issuer must perform or is prohibited from performing.
- A bond may also give the bondholder the right, but not the obligation, to take certain actions.

**Bonds may also contain features that make them more attractive to the issuer.**

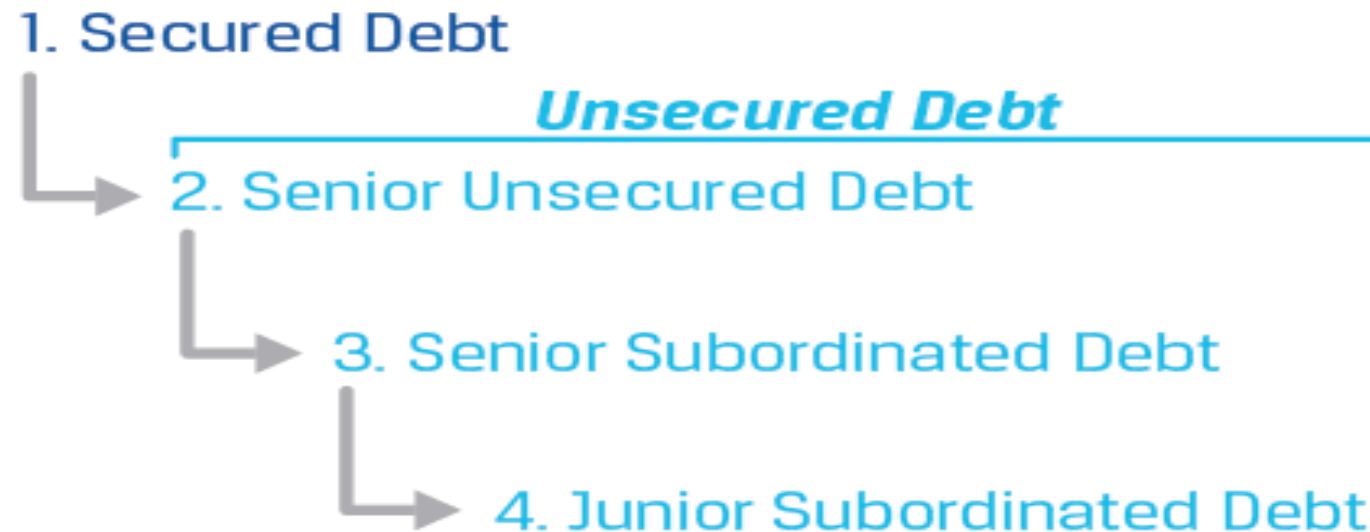
- These include giving the issuer the right, but not the obligation, to take certain actions.

A bond is governed by a legal contract between the bond issuer and the bondholders.

**The legal contract is sometimes referred to as the bond indenture or offering circular.**

LOS b: Describe features of debt securities.

# SENIORITY RANKING OF DEBT SECURITIES



**Secured Debt:** Securities with certain specific assets pledged as collateral

**Unsecured Debt:** Securities not backed by collateral

- **Subordinated debt** has a lower priority relative to other unsecured bonds in the event of default.

LOS c: Describe seniority ranking of debt securities when default occurs.

## PRACTICE Q: EXPERT

When a bond issuer defaults, the contract that allows bondholders to take legal action is the:

- A. covenant.
- B. bond indenture.
- C. subordination agreement.



## PRACTICE Q: EXPERT

When a bond issuer defaults, the contract that allows bondholders to take legal action is the:

A. covenant.

**B. bond indenture.**

C. subordination agreement.

**B is correct.** The bond indenture is the contract that provides bondholders the right to take legal action if the issuer fails to make the promised payments or fails to satisfy other terms specified within the bond indenture.

A is incorrect because covenants describe actions a bond issuer must perform and **are contained in the bond indenture.**

C is incorrect.

In the event that the company is liquidated, assets are distributed following a priority of claims, or seniority ranking. Not all debtholders have the same priority of claim: borrowers often issue debt securities that differ with respect to seniority ranking.

# TYPES OF BONDS

## Bonds, in general, can be classified by...

Issuer	Bonds issued by companies are referred to as corporate bonds.
	Bonds issued by central governments are sovereign or government bonds.
Market	The primary market is where new securities are issued and sold to investors.
	In the secondary market, investors trade with other investors.
Coupon Rates	Bonds are often categorised by their coupon rates: fixed-rate bonds, floating-rate bonds, and zero-coupon bonds.

•

LOS d: Describe types of bonds.

## FIXED-RATE BONDS

Walt Disney Bonds	5-Year, 1.35% Notes	10-Year, 2.75% Notes	30-Year, 4.375% Bonds
Total par value	\$750 million	\$750 million	\$350 million
Number of bonds issued	750,000	750,000	350,000
Par value of one bond	\$1,000	\$1,000	\$1,000
Coupon rate (annual)	1.35%	2.75%	4.375%
Semiannual coupon payment per bond	\$6.75	\$13.75	\$21.875
Maturity date	16 August 2016	16 August 2021	16 August 2041

Walt Disney Corporation bonds issued in August 2011

LOS d: Describe types of bonds.

## FLOATING-RATE BONDS

Nine-Month £2 Million Loan, Libor + 140 bps, Quarterly Reset

Date	Libor		Coupon Payment	Principal Payment
31 March	120 bps or 1.20%			
30 June	100 bps or 1.00%	$(0.0120 + 0.0140)/4$ $\times \text{£}2,000,000$	= £13,000	
30 September	112 bps or 1.12%	$(0.0100 + 0.0140)/4$ $\times \text{£}2,000,000$	= £12,000	
31 December		$(0.0112 + 0.0140)/4$ $\times \text{£}2,000,000$	= £12,600	+ £2 million

LOS d: Describe types of bonds.

## PRACTICE Q: EXPERT

A company issues a \$1 million floating-rate note on 30 June, maturing in six months with a coupon rate equal to three-month Libor plus 80 bps. Based on the following table, which Libor rate will be used to calculate the coupon payment on 30 September?

<b>Date</b>	<b>Libor</b>
30 Jun	0.85%
30 Sep	1.00%
31 Dec	1.15%

- A. 0.85%.
- B. 1.00%.
- C. 1.15%.

# PRACTICE Q: EXPERT

A company issues a \$1 million floating-rate note on 30 June, maturing in six months with a coupon rate equal to **three-month Libor plus 80 bps**. Based on the following table, which Libor rate will be used to calculate the coupon payment on 30 September?

Date	Libor
30 Jun	0.85%
30 Sep	1.00%
31 Dec	1.15%

**A is correct.** The quarterly interest will be reset at Libor plus a spread each quarter **in arrears**.

An annual rate is quoted although payments are made quarterly. To arrive at the next quarterly payment, Libor of 0.85% plus a spread of 0.80% are summed and divided by four quarters.

**The rate is set at the beginning of the quarter for the next payment date.**

- A. 0.85%.
- B. 1.00%.
- C. 1.15%.

Date	Libor		Coupon Payment
30 June	85 bps or 0.85%		
30 Sep	100 bps or 1.00%	$(0.0085 + 0.008)/4$ $\times \$1,000,000$	\$4,125

## INFLATION-LINKED BONDS

### An inflation-linked bond is a particular type of floating-rate bond.

- Inflation-linked bonds contain a provision that adjusts the bond's par value for inflation and thus protects the investor from inflation.
- Changes to the par value reduce the effect of inflation on the investor's purchasing power from bond cash flows.

For most **inflation-linked bonds**, the par value, not the coupon rate, of the bond is adjusted at each payment date to reflect changes in inflation (which is usually measured via a consumer price index).

- Because of the inflation protection offered by inflation-linked bonds, the coupon rate on an inflation-linked bond is lower than the coupon rate on a similar fixed-rate bond.

LOS d: Describe types of bonds.

## PRACTICE Q: EXPERT

Which of the following characteristics most likely remains unchanged during the life of an inflation-linked bond?

- A. Par value
- B. Coupon rate
- C. Coupon payments



## PRACTICE Q: EXPERT

Which of the following characteristics most likely remains unchanged during the life of an inflation-linked bond?

- A. Par value
- B. Coupon rate
- C. Coupon payments

**An inflation-linked bond is a particular type of floating-rate bond.**

- Inflation-linked bonds contain a provision that adjusts the bond's par value for inflation and thus protects the investor from inflation.
- Changes to the par value reduce the effect of inflation on the investor's purchasing power from bond cash flows.

For most **inflation-linked bonds**, the par value, not the coupon rate, of the bond is adjusted at each payment date to reflect changes in inflation (which is usually measured via a consumer price index).

- Because of the inflation protection offered by inflation-linked bonds, the coupon rate on an inflation-linked bond is lower than the coupon rate on a similar fixed-rate bond.

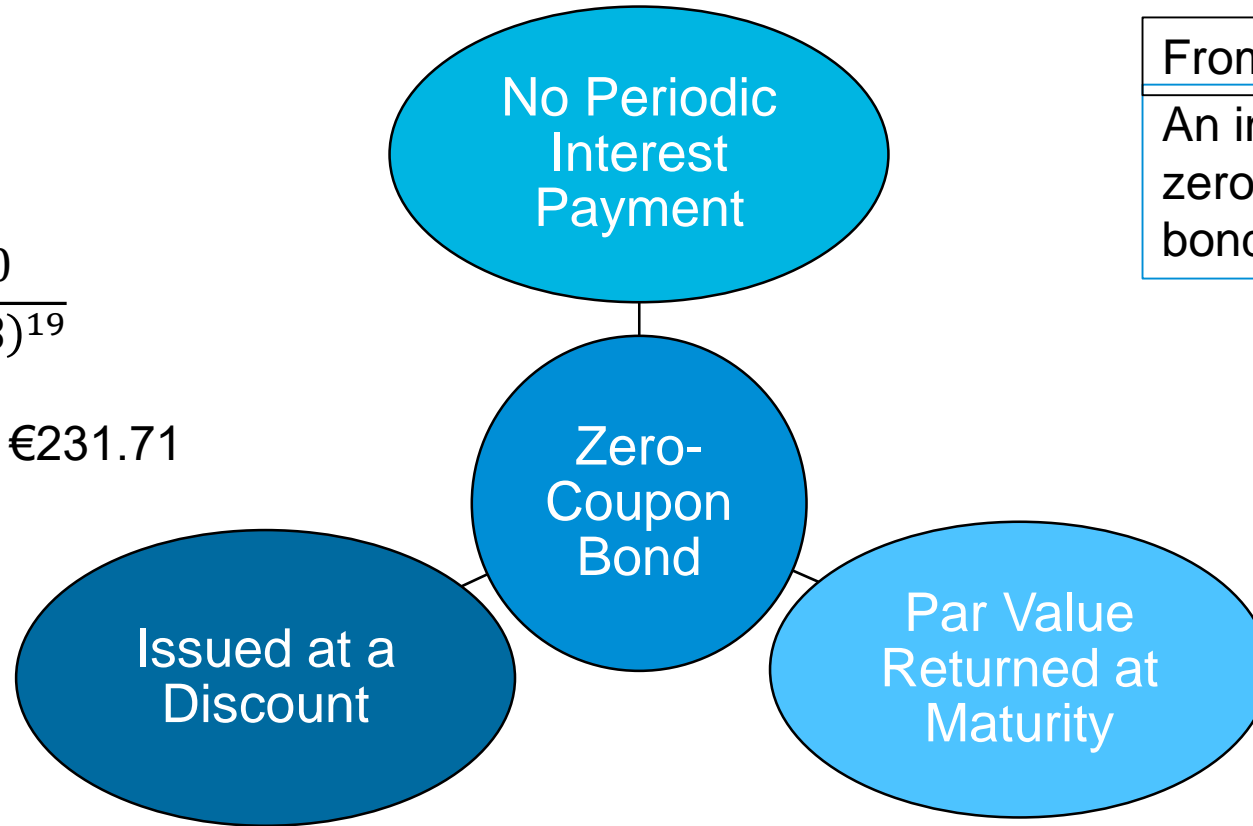
B is correct. The coupon rate usually remains unchanged. The par value of the bond, not the coupon rate, is adjusted at each payment date to reflect changes in inflation, usually measured by a consumer price index.

# ZERO-COUPON BONDS

$$PV = \frac{FV}{(1 + r)^N}$$

$$PV = \frac{€1,000}{(1 + 0.08)^{19}}$$

$$PV = \frac{€1,000}{4.31570} = €231.71$$



From Example 4

An investor buys a 20-year, €1,000 zero-coupon bond for €268.31. This bond will give a 6.8% annual return.

$$PV = \frac{FV}{(1 + r)^N}$$

$$PV = \frac{€1,000}{(1 + 0.068)^{20}}$$

$$PV = \frac{€1,000}{3.72756} = €268.27201$$

The difference between the issue price and the par value received at maturity represents the investment return earned by the bondholder over the life of the zero-coupon bond, and this return is received at maturity.

LOS d: Describe types of bonds.

# SUMMARY: FEATURES OF DEBT SECURITIES

## Bond Features

1. Par value, coupon, maturity
2. Fixed-rate coupon
3. Floating-rate coupon
4. Zero coupon
5. Covenants
6. Secured or unsecured
7. Seniority ranking

1. A typical debt security is characterised by three features: par value, coupon rate, and maturity date.
2. Fixed-rate bonds are the most common bonds and offer fixed coupon payments based on an interest (or coupon) rate that does not change over time.
3. Floating-rate bonds typically offer coupon payments based on a reference rate that changes over time plus a fixed spread.
4. The only cash flow offered by a zero-coupon bond is a single payment equal to the bond's par value to be paid on the bond's maturity date.
5. Covenants are legal agreements that describe actions the issuer must perform or is prohibited from performing to protect bondholders.
6. Debt securities are classified as either secured debt securities (secured by collateral) or unsecured debt securities (not secured by collateral).
7. In the event that the company is liquidated, assets are distributed following a priority of claims, or seniority ranking.

LOS b: Describe features of debt securities.

# BONDS WITH EMBEDDED PROVISIONS: CALLABLE BONDS



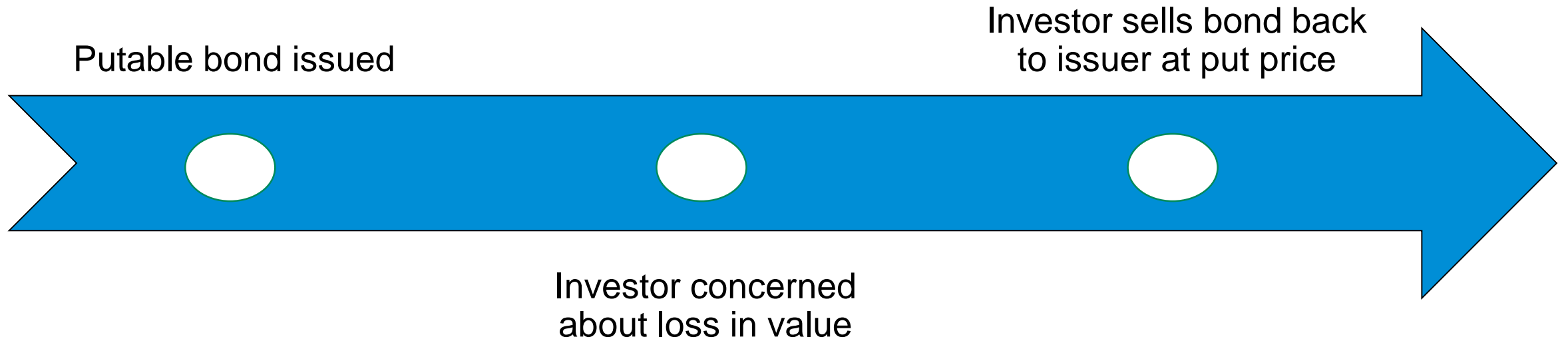
A **callable bond** provides the issuer with the right to buy back (retire or call) the bond from bondholders prior to the maturity date at a prespecified price referred to as the **call price**.

This provision is a **benefit to issuers**; they can pay off loans early or they can refinance if rates decline. Thus, such bonds offer a higher rate of return.

LOS e: Describe bonds with embedded provisions.

# BONDS WITH EMBEDDED PROVISIONS: PUTTABLE BONDS

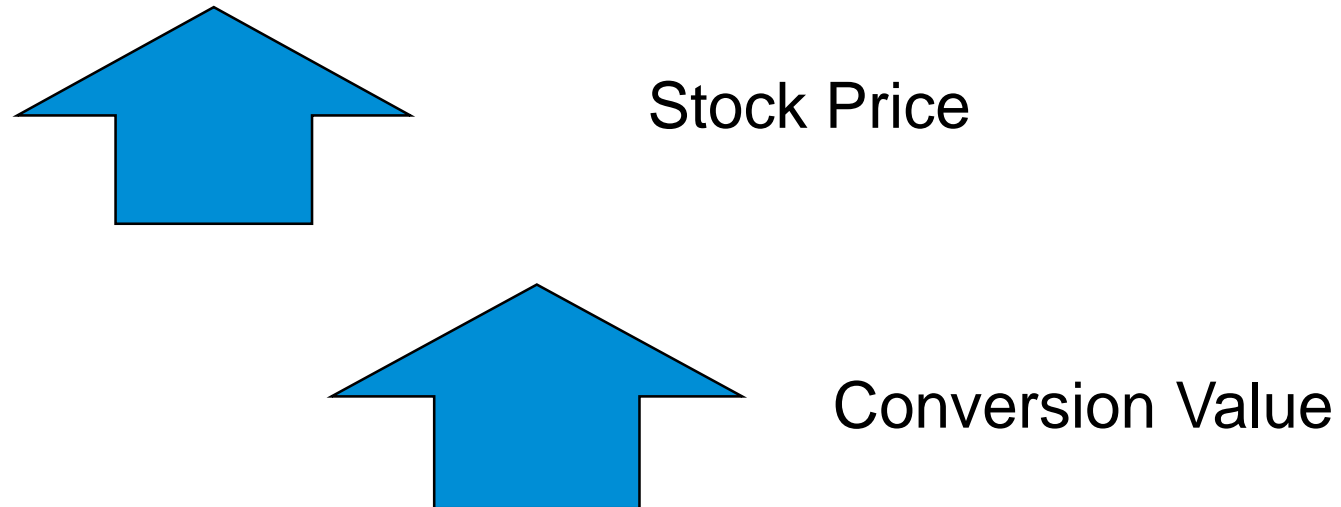
A put provision provides bondholders with the right to sell their bonds to the issuer prior to maturity at a pre-specified price.



This provision is a benefit to the investor if interest rates go up, so these bonds offer a lower coupon rate.

LOS e: Describe bonds with embedded provisions.

# BONDS WITH EMBEDDED PROVISIONS: CONVERTIBLE BONDS



This bond is a type of hybrid security that has characteristics of and relationships with both equity and debt securities.

A conversion provision provides bondholders with the right to convert the bonds into a pre-specified number of common shares of the issuing company.

LOS e: Describe bonds with embedded provisions.

## PRACTICE Q: MODERATE

Which of the following provisions in a debt security is a right of the issuer?

- A. Put
- B. Call
- C. Conversion

## PRACTICE Q: MODERATE

Which of the following provisions in a debt security is a **right of the issuer**?

- A. Put
- B. Call**
- C. Conversion

**B is correct.** The call provision provides bond issuers with the right to buy back the bonds prior to maturity at a pre-specified price.

A put provision provides bondholders with the right to sell their bonds to the issuer prior to maturity at a pre-specified price.

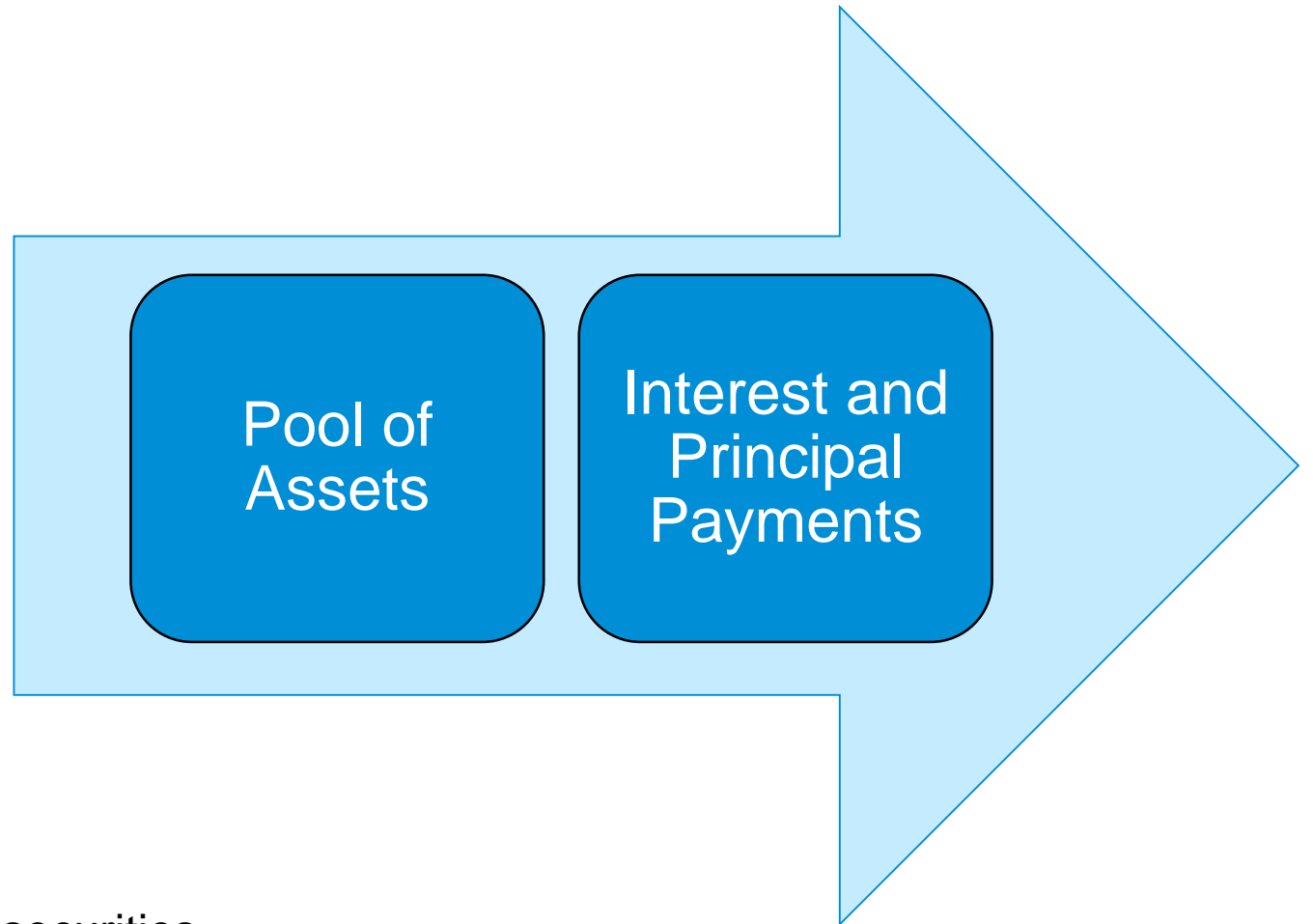
A conversion provision provides bondholders with the right to convert the bonds into a pre-specified number of common shares of the issuing company.



# ASSET-BACKED SECURITIES

## Pool of Assets

- Mortgages
- Credit Card Receivables
- Auto Loans
- Corporate Bonds



LOS f: Describe securitisation and asset-backed securities.

## PRACTICE Q: DIFFICULT

An implication of the liquidity of asset-backed securities relative to the underlying assets is that:

- A. investors accept a lower return for asset-backed securities.
- B. asset-backed securities are more difficult to price and sell.
- C. investors require a higher return for asset-backed securities.

## PRACTICE Q: DIFFICULT

An implication of the liquidity of asset-backed securities relative to the underlying assets is that:

- A. **investors accept a lower return for asset-backed securities.**
- B. asset-backed securities are more difficult to price and sell.
- C. investors require a higher return for asset-backed securities.

**A is correct.** The markets for asset-backed securities are **more liquid** than the markets for the underlying assets. Because investors value liquidity, they may pay more for the asset-backed security than for the individual underlying assets. Since they pay more for the asset-backed security, they are effectively accepting a lower return for these assets.

Most asset-backed securities make payments to investors on a monthly basis and include both an interest component and a principal component.

# SUMMARY: BONDS WITH EMBEDDED PROVISIONS

## Embedded Provisions

1. Callable bonds
2. Puttable bonds
3. Convertible bonds
4. Inflation-linked bonds
5. Securitisation

### An inflation-linked bond is a particular type of floating-rate bond.

- Inflation-linked bonds contain a provision that adjusts the bond's par value for inflation and thus protects the investor from inflation.
- Changes to the par value reduce the effect of inflation on the investor's purchasing power from bond cash flows.

For most **inflation-linked bonds**, the par value, not the coupon rate, of the bond is adjusted at each payment date to reflect changes in inflation (which is usually measured via a consumer price index).

- Because of the inflation protection offered by inflation-linked bonds, the coupon rate on an inflation-linked bond is lower than the coupon rate on a similar fixed-rate bond.

# CURRENT YIELD

A bond's current yield is calculated as the annual coupon payment divided by the current market price.

$$\text{Current Yield} = \frac{\text{Annual Coupon Payment}}{\text{Current Market Price}}$$

A bond's current yield provides bondholders with an estimate of the annualised return from coupon income only, without concern for the effect of any capital gain or loss resulting from changes in the bond's value over time.

- The current yield should not be confused with the discount rate used to calculate the value of the bond

LOS g: Define current yield.

## VALUATION OF FIXED-RATE AND ZERO-COUPON BONDS

$$V_0 = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots + \frac{CF_n}{(1+r)^n}$$

$$PV = \frac{FV}{(1+r)^n}$$

$$V_0 = \frac{CF}{(1+r)^n}$$

Three-year bond, \$1,000 face value, 6% coupon, semiannual payments, discounted at 7% (3.5% every six months)

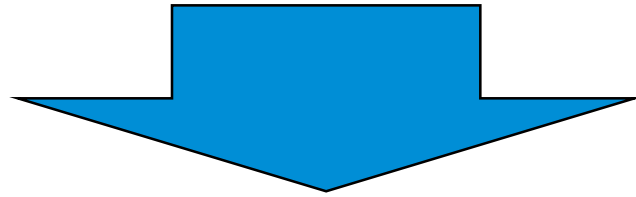
$$\begin{aligned} V_0 &= \frac{\$30}{(1.035)^1} + \frac{\$30}{(1.035)^2} + \frac{\$30}{(1.035)^3} + \frac{\$30}{(1.035)^4} + \frac{\$30}{(1.035)^5} + \frac{\$1,030}{(1.035)^6} \\ &= \$973.36 \end{aligned}$$

*Note:* Because the discount rate (7%) is higher than the coupon rate (6%), the present value is less than its face value.

LOS h: Describe the discounted cash flow approach to valuing debt securities.

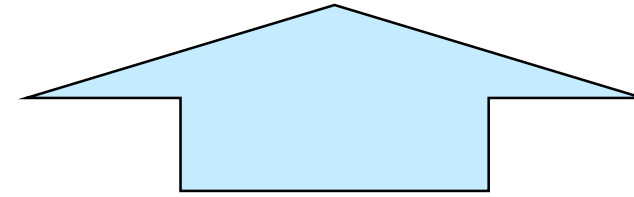
YIELD TO MATURITY

$$V_0 = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots + \frac{CF_n}{(1+r)^n}$$



Bond's Price

Yield to Maturity (YTM)

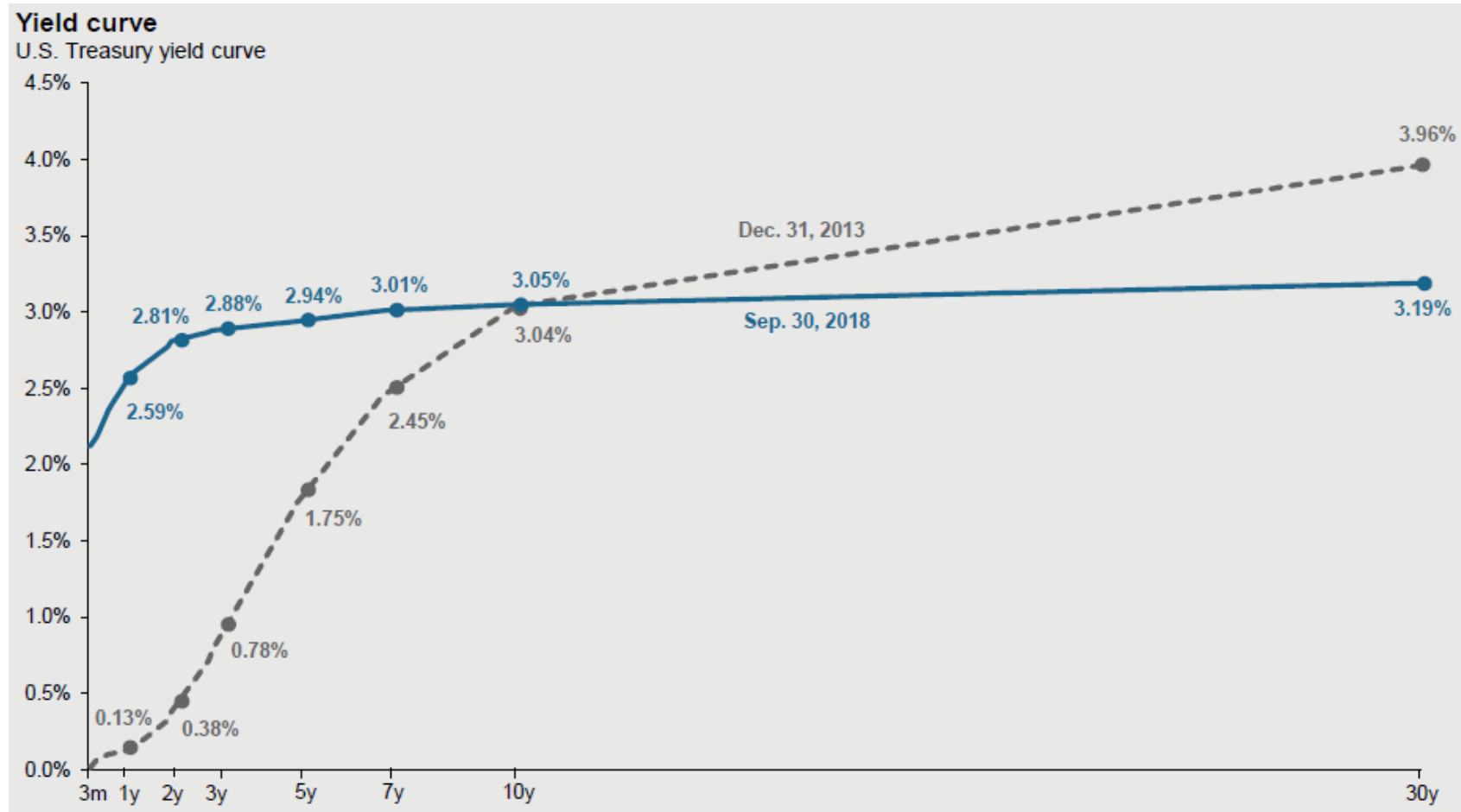


$$P_0 = \frac{CF_1}{(1+r_{ytm})^1} + \frac{CF_2}{(1+r_{ytm})^2} + \frac{CF_3}{(1+r_{ytm})^3} + \dots + \frac{CF_n}{(1+r_{ytm})^n}$$

YTM > Coupon Rate	Face Value > PV of Bond
YTM = Coupon Rate	Face Value = PV of Bond
YTM < Coupon Rate	Face Value < PV of Bond

LOS i: Describe a bond's yield to maturity.

# Yield Curve



Source: FactSet, Federal Reserve, J.P. Morgan Asset Management.  
Guide to the Markets – U.S. Data are as of September 30, 2018

The **term structure of interest rates**, often referred to simply as the **term structure**, shows how interest rates on government bonds vary with maturity and is often presented in graphical form, referred to as the **yield curve**.

LOS k: Define yield curve.



# SUMMARY: BOND VALUATION

## Valuation

1. Current yield
  2. Price (estimated by using discounted cash flows)
  3. Yield to maturity
  4. Term structure of interest rates (yield curve)
- 
1. A bond's current yield is calculated as the annual coupon payments divided by the current market price.
  2. The value (price) of a typical debt security is usually estimated by using a discounted cash flow approach.
  3. The yield to maturity is the discount rate that equates the present value of a bond's promised cash flows to its market price.
  4. The term structure of interest rates depicts the relationship between government bond yields and maturities and is often presented in graphical form as the yield curve.

# RISKS OF INVESTING IN DEBT SECURITIES

Investing in debt securities is generally considered less risky than investing in equity securities, but bondholders still face a number of risks: credit risk, interest rate risk, inflation risk, liquidity risk, reinvestment risk, and call risk.

**Credit risk**, sometimes referred to as default risk, is the risk of loss resulting from the borrower, or bond issuer, failing to make full and timely payments of interest and/or principal.

LOS I: Explain risks of investing in debt securities.

# CREDIT RATING

Bond Ratings	Standard & Poor's	Moody's	Fitch
Investment Grade	AAA to A–	Aaa to A3	AAA to A–
	BBB+ to BBB–	Baa1 to Baa3	BBB+ to BBB–
Non-Investment Grade	BB+ to B–	Ba1 to B3	BB+ to B–
	CCC+ to CCC–	Caa1 to C	CCC
	D		DDD to D

**Investment-grade bonds:** Regulators often specify that certain investors, such as insurance companies and pension funds, must restrict their investments to or largely hold bonds with a high degree of creditworthiness.

**Non-investment-grade bonds:** Commonly referred to as **high-yield bonds** or **junk bonds**.

LOS I: Explain risks of investing in debt securities.

From Exhibit 3

## PRACTICE Q: EXPERT

The assignment of BB and BBB ratings by an independent rating agency implies what type of credit risk classification, respectively?

- A. Junk bond, high yield
- B. High yield, investment grade
- C. Investment grade, non-investment grade

# PRACTICE Q: EXPERT

The assignment of BB and BBB ratings by an independent rating agency implies what type of credit risk classification, respectively?

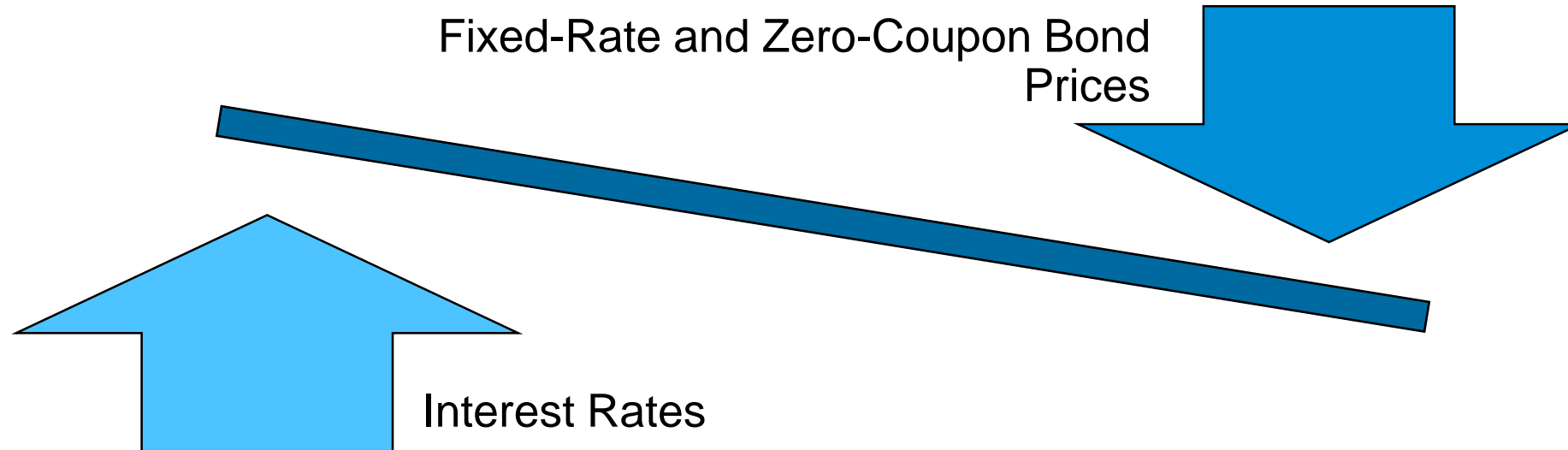
- A. Junk bond, high yield
- B. High yield, investment grade
- C. Investment grade, non-investment grade

**B is correct.** Bonds are classified based on credit risk as investment-grade bonds or non-investment-grade bonds, the latter are also referred to as high-yield or junk bonds. Investment-grade bonds are rated AAA, AA, A, and BBB, whereas high-yield bonds are rated BB, B, and CCC.

	Standard & Poor's	Moody's	Fitch
Investment Grade	AAA	Aaa	AAA
	AA+	Aa1	AA+
	AA	Aa2	AA
	AA-	Aa3	AA-
	A+	A1	A+
	A	A2	A
	A-	A3	A-
	BBB+	Baa1	BBB+
	BBB	Baa2	BBB
	BBB-	Baa3	BBB-
Non-Investment Grade	BB+	Ba1	BB+
	BB	Ba2	BB
	BB-	Ba3	BB-
	B+	B1	B+
	B	B2	B
	B-	B3	B-
	CCC+	Caa1	CCC
	CCC	Caa2	
	CCC-	Caa3	
		Ca	
	C		
		DDD	
		DD	
		D	

↑ Creditworthiness ↓

# INTEREST RATE RISK



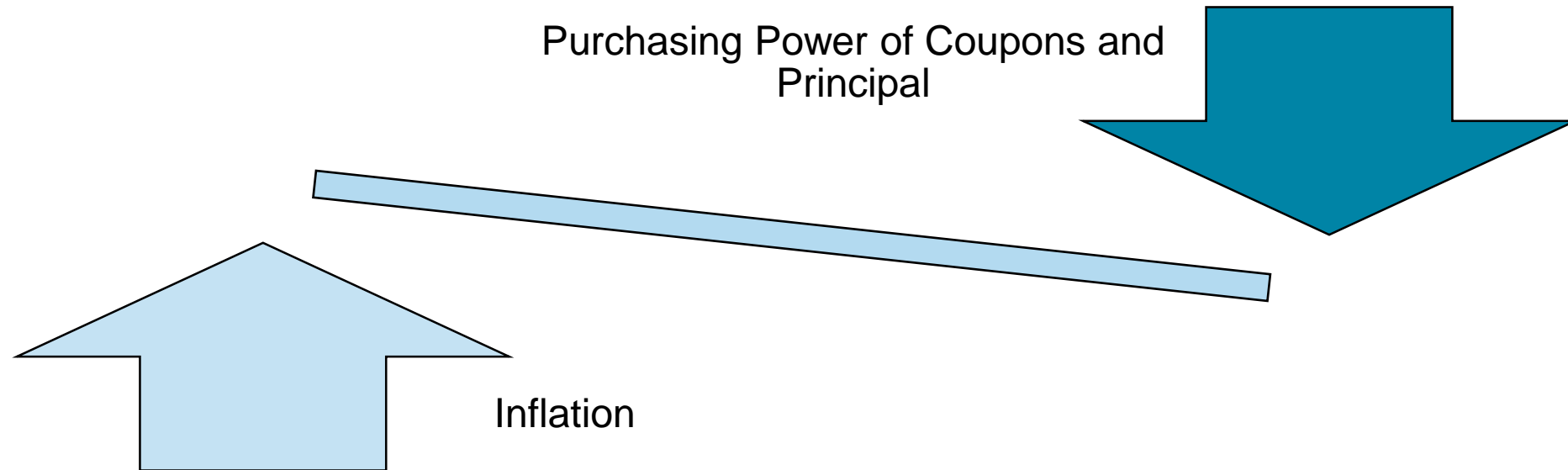
**Fixed-rate and zero-coupon bonds** face the risk that if interest rates increase, the value of the bond will decrease.

**For floating-rate bonds**, the risk is that interest rates will decline and the bondholders will receive less coupon income.

LOS I: Explain risks of investing in debt securities.

# INFLATION RISK

Floating-rate bonds partially protect against inflation because the coupon rate adjusts.



For most **inflation-linked bonds**, the par value, not the coupon rate, of the bond is adjusted at each payment date to reflect changes in inflation (which is usually measured via a consumer price index).

- Because of the inflation protection offered by inflation-linked bonds, the coupon rate on an inflation-linked bond is lower than the coupon rate on a similar fixed-rate bond.

LOS I: Explain risks of investing in debt securities.

## OTHER RISKS

Liquidity Risk	Being unable to sell a bond prior to the maturity date without having to accept a significant discount to market value.
Reinvestment Risk	In a period of falling interest rates, the coupon payments received during the life of a bond and/or the principal payment received from a bond that is called early must be reinvested at a lower interest rate than the bond's original coupon rate.
Call Risk (Prepayment Risk)	The issuer will buy back (call) the bond issue prior to maturity through the exercise of a call provision.

LOS I: Explain risks of investing in debt securities.



# RISKS OF INVESTING IN BOND SECURITIES

## Risks

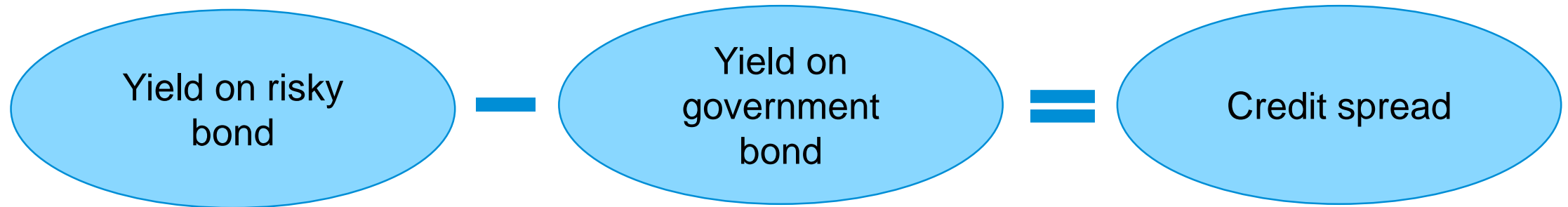
1. Credit risk
  - a. Credit rating
  - b. Credit spread
2. Interest rate risk
3. Inflation risk
4. Liquidity risk
5. Reinvestment risk
6. Call risk

1. Credit or default risk is the risk of loss if the borrower, or bond issuer, fails to make full and timely payments of interest and/or principal.
  - a. Independent credit rating agencies assess the credit quality of particular bonds.
  - b. The credit spread is the difference in the yields of two bonds with the same maturity but different credit quality.
2. Interest rate risk is the risk that interest rates will change.
3. Inflation risk is the risk that promised interest payments and final principal payments for many securities are not modified for changes in inflation.
4. Liquidity risk is the risk of being unable to sell a bond prior to the maturity date without having to accept a significant discount to market value.
5. Reinvestment risk refers to the fact that if market interest rates fall after a bond is issued, bondholders will most likely have to reinvest the income received on the bond (the coupon payment) at the current lower interest rates.
6. Call risk is the risk that the issuer will buy back (redeem or call) the bond issue prior to maturity through the exercise of a call provision.

LOS I: Explain risks of investing in debt securities.

## CREDIT SPREADS

The difference between a risky bond's yield to maturity and the yield to maturity on a government bond with the same maturity as the risky bond's credit spread.



Higher-risk bonds, such as junk bonds, trade at wider credit spreads because of their higher default risk.

A bond perceived to have experienced an improvement in credit quality will see its price rise and its yield fall, likely resulting in a narrower credit spread relative to a comparable government bond.

LOS m: Define a credit spread.

# CREDIT SPREADS

Caterpillar, a US company, has a bond outstanding with a maturity date of 27 May 2041. The bond's coupon rate is 5.2%. On 13 April 2012, the bond was trading at a price of \$1,185.32, representing a yield to maturity of 4.10%.

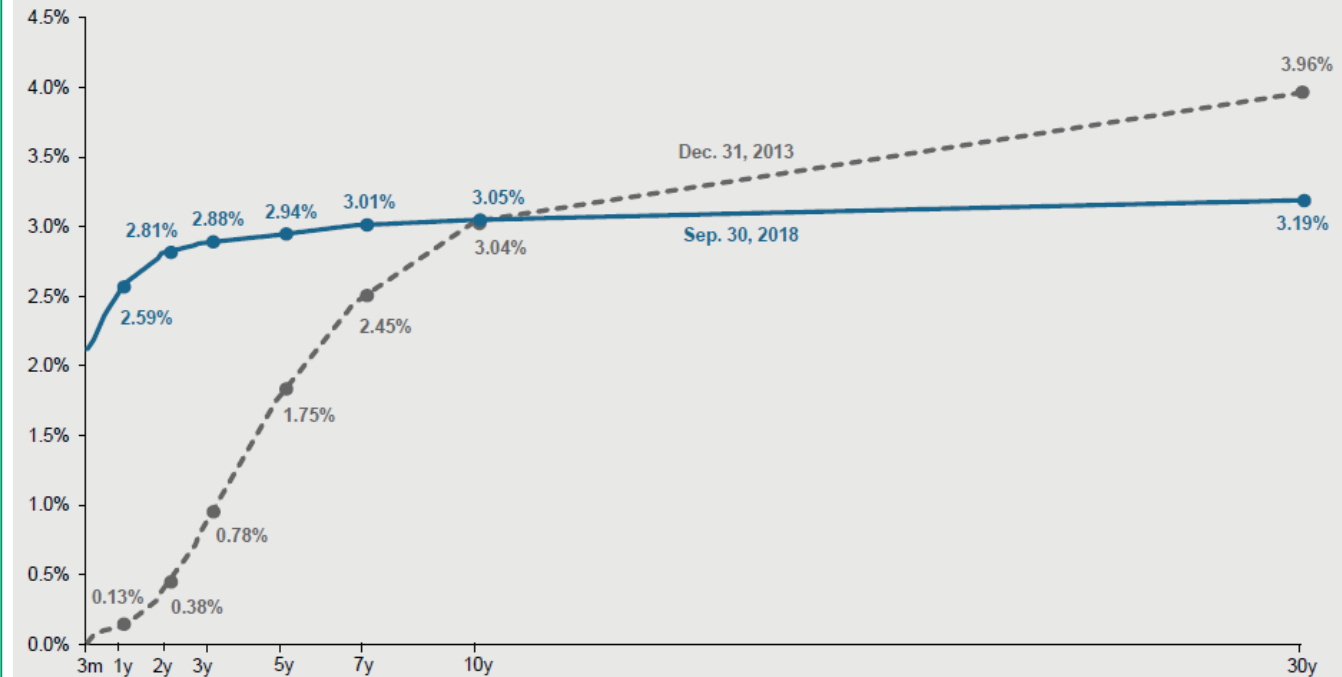
The bond has approximately 29 years remaining until maturity as of 13 April 2012. On that same date, 30-year Treasury bonds are yielding 3.22%.

The bond's credit spread over a 30-year Treasury is  $4.10\% - 3.22\% = 0.88\%$ , or 88 bps.

The extra yield, or credit spread, being offered by the Caterpillar bond serves as compensation to the investor for taking a higher risk relative to the Treasury bond.

## Yield curve

U.S. Treasury yield curve



Source: FactSet, Federal Reserve, J.P. Morgan Asset Management.  
Guide to the Markets – U.S. Data are as of September 30, 2018.

LOS m: Define a credit spread.